Curriculum Vita
of
Emad M. El-Giar, Ph.D.

Education:

- Cairo University, Giza, Egypt, 1984-1987. B.S. (Distinction with Class Honor) in Chemistry, May 1987
- Cairo University, Giza, Egypt, 1987-1991. M.S. in Physical Chemistry, March 1991
- Cairo University, Giza, Egypt, 1991-1995. Graduate studies in Physical and electrochemistry
- University of Manitoba, MB, Canada, 1995-1997. Graduate studies in scanning probe microscopy
- Mississippi State University, MS, 1997-2004. Ph.D. in Electroanalytical Chemistry under the directions of Dr. David O. Wipf. Degree conferred in May 2004

Present Position:

- Assistant Professor of Analytical Chemistry at the University of Louisiana at Monroe (ULM). Member of the ULM faculty since August 1997.

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The University of Louisiana at Monroe
700 University Avenue
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Professional Activities

- Peer reviewer for the journal of *Analytica Chimica Acta*

Other Appointments:

- Postdoctoral Fellow, Department. of Chemistry, Mississippi State University, May 2004 - August 2007
- Visiting Researcher, Department of Electrical and Computer Engineering, University of Manitoba, MB, Canada, July 1995 - August 1997

Research Interests:

- Fabrication of microfluidic devices in plastics and polymeric material for the electrophoretic separations, manipulation, and detection of biomolecules.

  Synopsis: This research involves the design, microfabrication, and characterization of microfluidic channels in different plastic materials using different microfabrication techniques such as hot embossing and wire imprinting methods. These microfluidic devices are used for electrophoretic separation and detection of biomolecules (e.g., DNA and proteins). This work includes the use of several instruments for characterization of the microfluidic channels (such as optical microscopy, optical profiling systems, scanning electron microscope (SEM), contact angle measurements) as well as regular capillary electrophoresis (CE), UV/Vis, and luminescence spectrometric measurements. It also includes the integration of different electrodes (such as ITO, Au, Pt) to the surface of the microdevices for the control of the flow of the biomolecules and/or the electrochemical detection of the separated species.

- Preparation and characterization, ultramicroelectrodes (UMEs) for scanning electrochemical microscopy (SECM) and other electroanalytical applications.

  Synopsis: In this line of research, amperometric (e.g., C-fiber-based) and potentiometric (e.g., Iridium oxide pH-sensitive) UMEs are fabricated using relatively cheap, simple, reliable, and reproducible methods. Once fabricated, the UMEs are characterized using several electrochemical as well as surface analysis techniques. These UMEs are mainly used as probes (tips) for SECM applications. However, they are also usable for other electroanalyis applications.

Journal Publications

1. **El-Giar, E. M.;** Wipf, D. O. “Microparticle-Based Iridium Oxide Ultramicroelectrodes for pH Sensing and Imaging.”, *Journal of Electroanalytical Chemistry*, **2007**, *609*, 147-154).

2. **El-Giar, E. M.**; Wipf, D. O. “Preparation of Tip-Protected Poly(oxyphenylene) Coated Carbon-Fiber Ultramicroelectrodes.”, Electroanalysis **2006,** *18*, 2281-2289.

3. **El-Giar, E. M.**; Said, R. A.; Bridges, G. E.; Thomson, D. J. "Localized Electrochemical Deposition of Copper Microstructures.", Journal of the Electrochemical Society **2000,** 147, 586-591.

4. Badawy, W. A.; Momtaz, R. S.; Afify, H. H.; **El-Giar, E. M.** "Antimony-Incorporated Titanium Dioxide (TiO_2) Thin Films: Preparation and Optical and Electrical Characteristics.", Journal of Materials Science **1991,** 2, 112-115.

5. Badawy, W. A.; Momtaz, R. S.; **El-Giar, E. M.** "Solid State Characteristics of Indium-Incorporated Titanium Dioxide (TiO_2) Thin Films.", Physica Status Solidi A **1990,** 118, 197-202.

6. Badawy, W. A.; Afify, H. H.; **El-Giar, E. M.** "Optical and Photovoltaic Characteristics of Indium-Modified Tin Dioxide Thin Films.", Journal of the Electrochemical Society **1990,** 137, 1592-1595.

Book Chapters

7. **El-Giar, E. M.**; Waddell, E. A..; Jacobs, M.; Thomas, G. Fabrication of Bioanalytical Microfluidic Devices. In "*Biological Applications of Microfluidics"*; Gomez, F. A., Ed.; Wiley & Sons, N.Y., spring **2008** (In press).

8. Thomas, G.; **El-Giar, E. M.**; Locascio, L. E.; Tarlov, M. J. Hydrogel-Immobilized Antibodies for Microfluidic Immunoassay (Hydrogel Immunoassays). In *Methods in Molecular Biology*, Vol. 321 (*Microfluidic Techniques: Reviews and Protocols)*; Minteer, S. D., Ed.; Humana Press: Totowa, NJ, **2006**; pp 83-95.

Journal Manuscripts in Preparation

- **El-Giar, E. M.**; Wipf, D. O. *"SECM applications of a Microparticle-Based Iridium Oxide pH Ultramicroelectrode."*

- **El-Giar, E. M.**; Oldham, P. B.; Thomas, G. *"Integration of Indium Tin Oxide (ITO) Electrodes in Poly(methyl methacrylate) (PMMA) Microfluidic Devices for Bioanalytical Applications."*

- Chen, H.; **El-Giar, E. M.**; Locascio, L. E.; Tarlov, M. J.; Thomas G. ***"****Hydrogel Based Immobilization of Antibodies for Microfluidic Analyses."*

- **El-Giar, E. M.**; Wipf, D. O. *"Scanning Electrochemical Microscopy (SECM) Examination of the O_2 Reduction on Cast Iron."*

Conference Proceedings

1. **El-Giar, E. M.**; Thomson, D. J*. "Localized Electrochemical Plating of Interconnectors for Microelectronics."*, *Proceedings of the IEEE Conference on Communications, Power and Computing, WESCANEX 97* **1997**, 327-332.

2. Badawy, W. A.; **El-Giar, E. M. "***Preparation, Electrochemical, Photoelectrochemical and Solid State Characteristics of Indium-Incorporated Titanium Dioxide Thin Films for Solar Energy Applications."*, *Proceedings of SPIE-The International Society for Optical Engineering* **1991,** *1536*, 277-288.

Presentations

1. **El-Giar, Emad M.;** Oldham, Philip B.; Thomas, Gloria *"Integration of Indium-Tin Oxide (ITO) Electrodes in Poly(methyl methacrylate) (PMMA) Microfluidic Devices for Bioanalytical Applications."*, Poster, PITTCON **2007**, Chicago, IL, March 17-22, **2007**.

2. **El-Giar, Emad M.**; Oldham, Philip B.; Thomas, Gloria *"Characterization of Indium-Tin Oxide (ITO) for Use as Microelectrodes in Polymeric Microdevices.",* Oral Presentation, 58th Southeast Regional Meeting of the American Chemical Society (SERMACS), Augusta, GA, November 1-4, **2006**.

3. Thomas G.; Chen, H.; **El-Giar, E. M.**; Burgess, S. "Interdisciplinary Research in Microfluidics: Where Chemistry, Biology and Materials Science Meet.", Oral Presentation, 58th Southeast Regional Meeting of the American Chemical Society (SERMACS), Augusta, GA, November 1-4, 2006.

4. **El-Giar, Emad M.**; Oldham, Philip B.; Thomas, Gloria *"Photopatterned Indium-Tin Oxide (ITO) Electrodes in Integrated Microfluidic Devices."*, Oral Presentation, 231st American Chemical Society (ACS) National Meeting & Exposition, Atlanta, GA, March 26-30, **2006.**

5. Badawy, W. A.; Momtaz, R. S.; Afify, H. H.; **El-Giar, E. M.** *"Antimony-Incorporated Titanium Dioxide (TiO_2) Thin Films: Preparation, Optical and Electrical Characteristics.",* The XXV Conference on: Solid State Physics and Materials Science & Workshop on: Photonic Materials and Optoelectronic Devices (II), Luxor, Upper Egypt, March 6-10, **2005**.

6. **El-Giar, Emad M.**; Oldham, Philip; Thomas, Gloria *"Optimization of Hot Embossing of Poly(methyl methacrylate) (PMMA) Microfluidic Devices"*, Oral Presentation, 57th Southeast / 61stSouthwest Joint Regional Meeting of the American Chemical Society, Nov. 1-4, Memphis, TN, 2005.

7. **El-Giar, E. M.**; Wipf, D. O. *"Scanning Electrochemical Microscopy Examination of the O_2 Reduction on Cast Iron"*, Poster Presentation, 203rd ECS meeting, April 27 - May 2, **2003**, Paris, France.

8. **El-Giar, E. M.**; Wipf, D. O. *"Scanning Electrochemical Microscopy Imaging with pH Sensitive Iridium Oxide Microelectrodes"*, Oral Presentation, PITTCON, March 17-22, **2002**, New Orleans, LA.

9. Wipf, D. O.; Alpuche Aviles M. A.; **El-Giar, E. M.** *"A Constant-Distance Scanning in SECM",* Oral Presentation, PITTCON **2001**, New Orleans, LA.

10. **El-Giar, E. M.**; Wipf, D. O. *"Scanning Electrochemical Microscopy Imaging with pH Sensitive Iridium Oxide Microelectrodes"*, Poster, PITTCON **2001**, New Orleans, LA.

11. **El-Giar, E. M.**; Wipf, D. O. *"A New Procedure for the Construction of Small Carbon-Fiber Electrodes"*, Oral Presentation, PITTCON **2000**, New Orleans, LA.

Courses Taught at ULM

1. General Chemistry I (CHEM 107)
2. General Chemistry II (CHEM 108)
3. General Chemistry I Lab (CHEM 109)
4. General Chemistry II Lab (CHEM 110)
5. Introductory General Chemistry Lab (CHEM 103)
6. Quantitative Inorganic Chemistry Lab (CHEM 241)
7. Instrumental Analysis Lab (CHEM 407)

Honors

- Nominated for the T.A. of the year, Mississippi State University, 2003-2004
- Graduate assistantship (TA and/or RA), Mississippi State University, 1997-2004
- Faculty of Science award, Cairo University, 1988
- Top Graduate and Outstanding Senior B.S., Cairo University, Faculty of Science, 1987